third bright ring, which, too, would be less brilliant than in a refractor.

It would require a good deal of labour in interpolating to get the diameters and brilliancy of the rings in a reflector where the small speculum is, as usual, only large enough to show a central object, or about one-ninth of that of the speculum, but it is evident that these would be intermediate between the two sets of values above given, and that there can be no theoretical reason why rings should be absent if carefully looked for under suitable circumstances, provided the figure is good.

I would add that I believe that the great diameter of the images of large stars on photographs will be explained, at all events in part, by the fact that the visible image is by no means all the acting light. If a plate be exposed so as to show stars of the 14th magnitude on the Paris scale, then we shall have sensible impressions made by light whose intensity is $\frac{1}{2 \cdot 5^{13}}$ of that of a 1st magnitude star. Roughly, we may call this $\frac{1}{149000}$ of the light, the distance from the centre of the image at which this fails is far beyond the powers of the integral table given in Sir G. Airy's little book, and I doubt if it could be determined with any accuracy, for at so great a distance the spectra would overlap, and it would be necessary to estimate the total effect of range of those colours which are impressed on the plate. Manifestly, however, the photographic image would be very large, though it does not seem possible it can fill the great space we sometimes see.

Of course light diffused within the photographic film would add its effects to those of incident lights.

P.S.—In a more recent communication M. Henry tells me that they some time ago tried specula up to 50 cm. (nearly 20 inches) with various sized patches, and under favourable circumstances found just such a brilliant ring as I have described.

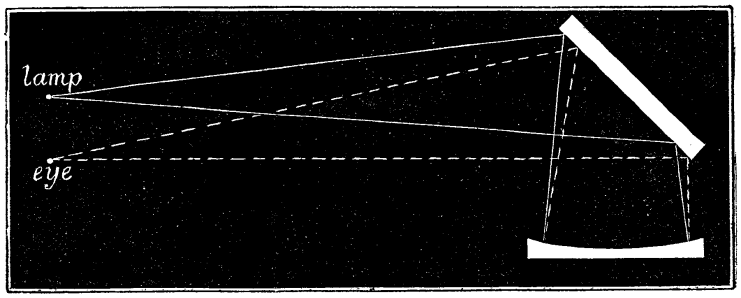
Note on Testing Polished Flat Surfaces.

By A. A. Common, F.R.S.

The following method of testing flat surfaces has some advantages over the methods generally employed, and is particularly useful in enabling the errors to be localised exactly. It is an extension of Foucault's method of testing concave surfaces, and consists in putting on the flat surface to be tested, in the cone of rays coming from a concave surface in the process of testing by Foucault's method, and thus finding the effect of the reflection on the course of the rays.

The concave mirror should strictly be quite spherical and, of course, somewhat larger than the plane surface to be tested, but an ordinary speculum will do almost as well; any errors that

the concave may have can be separated from the errors of the flat by rotating the one or the other and so taken account of.



The diagram given shows at once the arrangement, from which it will be seen that in this case the plane mirror receives the light from the lamps and from the mirror also, so that any error of the plane mirror would be doubled before reaching the eye.

In order to use this plan the method of testing concave surfaces described by Foucault must be thoroughly understood, as the one is only an extension of the other, and the pinhole, the straight line or system of squares, and the screen are to be used exactly as testing a concave mirror, but the whole of the testing can be done at the centre of curvature, and if a strictly spherical mirror be used the test can be made almost a rigid one.

Notes on the Solar Surface of 1887. By S. J. Perry, D.Sc., F.R.S.

Having just completed the measurement of the Sun's spot-area observed at Stonyhurst in 1887, I thought that some of the results might fitly be brought at once before the Society. The number of days in each month in which drawings were obtained was respectively 11, 18, 24, 22, 22, 28, 30, 25, 21, 23, 17, and 18, making a total of 259 days in the course of the twelve months.

When the areas had been reduced to millionths of the solar hemisphere and represented graphically, the first point that struck the eye was the prolongation of the minimum period during the first four months of the year, with its sudden cessation at the opening of May. We have thus already in this eleven-year period two minima, one lasting from September 22 to December 8 of 1886, or for two months and a half, and the other extending over the first third of 1887, more than twice as many days without spots being noted in the second period than in the first. But if we include both these periods in the same minimum, by neglecting the interruption at the close of 1886, then the whole minimum period includes 222 days, and the date of the minimum may be given approximately as January 10, 1887. In thus speaking of the minimum I do not wish it to be inferred